

Thin-Client Computing For Retail Point-of-Sale

A National Semiconductor White Paper



Table of Contents

I. Executive Summary	3
II. Retail Trends Driving Thin-Client Acceptance	5
A. Rising IT Costs	
B. High Employee Turnover	
C. New Kinds Of Competition And Consumer Buying Methods	
III. How Thin-Client POS Benefits Retailers And Solutions Providers	6
A. Cost-Reducing Efficiencies	
B. Customer Service Improvements	
C. Business Growth	
IV. Technology Overview	10
A. Thin-Client Defining Features	
V. Conclusion	11
A. Thin Client Increases Value Of POS	

Ask retailers to name their top challenges and you're likely to hear: Unrelenting competition spurred by global ecommerce and the rocketing costs of IT ownership. They're calling for technology that helps hold the line against *both* competition and costs. They want tools that offer customer service advantages and streamline operations.

Until recently, improving service and efficiency often meant investing in higher and higher performance desktop hardware and software. But all those complex, high-maintenance systems have compounded economic pressures on retailers. Now top technology companies are offering an alternative: Thin-client computing, which provides the best performance level at the least possible cost. In this networked approach to IT, the central server runs the business applications and stores IT data for instant access by simple drive-free terminals. The concept is flexible in that thin-client computing devices can replace or co-exist alongside traditional PCs in the workplace.

A thin client is a solid state device containing a microprocessor, graphics capability, network interface, video subsystem, and enough memory to run system software connecting it to the server. A thin client consumes minimal power. It needs very little local storage, local configuration or maintenance since all the real work is done at the server.

This fast, low-cost computing model was introduced in the mid-1990s, many believe before its time. While not an overnight success and still not well understood by many companies, thin client has proven its worth in diverse settings and industries. Now movers and shakers in the retail world are taking a second look at this small, but mighty technology.

Demand For Thin Client Is Growing

With the economic downturn, IT managers want more bang for fewer bucks. And that's exactly what thin-client computing provides: A low total cost of ownership (TCO) and a high return on investment (ROI).

International Data Corporation (IDC) reports that world-wide shipments of enterprise thin clients are currently on the verge of breaking the 1 million barrier. From 1998 to 1999, thin-client volumes increased nearly 90 percent, to 700,000 worldwide. According to IDC, they reached 900,000 in 2000, and before 2001 is over, they will surpass 1.3 million. IDC believes if the industry does a good job educating the market, shipments will earn an increase just short of 10 times their 2000 volume, bringing them to 8.7 million in 2005.

A Perfect Fit For Retail

Thin-client computing is the perfect tool for these retail times. It fosters customer service innovations and dramatically reduces overhead. One of thin client's greatest qualities is versatility, which is why it's being applied throughout the retail operation. This white paper focuses on its advantages at point-of-sale (POS). For a broader discussion, see "Thin-Client Computing: Competitive Edge for Retail and Banking Sectors", a National Semiconductor White Paper.

The Right Tool For The Job

Thin clients are not expected to replace powerful desktop machines, one for one. It's a matter of fitting the right tool to the job without over-investing in desktop memory and processing power. Instead of replacing PCs, thin clients will provide a tool that enables task-based workers to be more productive and enterprises to extend access points to new users and additional locations.

What better fit for retail point-of-sale than thin client?

Point-of-sale is pivotal to a retailer's success in that it both touches the customer and it strongly influences the efficiency of a store. Like the quarterback on a football team, POS can make or break the operation. Agile, yet durable, thin client brings to POS exactly what it needs: instant access to line of business applications, Internet and intranet information, ease-of-use, reliability, and speed.

Thanks to thin-client capabilities, POS is becoming a far more versatile player. It can be staffed or self-service – or both, as traffic dictates. It can take the form of a terminal, multimedia kiosk, wireless handheld, and no doubt other yet-to-emerge devices.

With thin-client POS, merchants can achieve faster, better and more affordable levels of service, enhance the retail experience for customers, reach new markets, generate new revenue streams... and leave hesitant competitors in the dust.

To remain competitive in the consumer retail channel, technology providers must keep current with the business issues affecting their customers. Today, these include rising IT costs, high employee turnover, competitive pressures from ecommerce and brick-and-mortar consolidations, and new consumer buying preferences.

A. Rising IT Costs

Reducing costs is top-of-mind for today's margin-conscious retailers. For most, the biggest chunk of overhead comes under the total cost of IT ownership (TCO) column. These items entail not only the initial outlay for hardware and software, which has climbed with the complexity of PCs, but the even higher cost of installing, supporting and updating the infrastructure over time. For a department store, the initial cost of installing a new system can run upwards of \$750K per store. The cost of hardware and software maintenance can run several thousand dollars a year per unit.

[IHL 2001 North American Retail Point-of-Sale Market Study]

High-salaried onsite IT administrators must physically deploy applications to every client, as well as deal with version control issues, remote administration, multiple system configurations and data replication. Then there's the lost productivity from users tinkering with their own machines. A Gartner Group TCO study found that the cost of user self-support can top even the hardware capital costs in the long run.

Security breaches are yet another rising cost associated with PC environments. The impact of both unauthorized access and lost or stolen information has been estimated at as much as 40% of TCO. Harder to quantify, but undeniably costly, is the lost opportunity from system downtime.

Over the course of 2000-2001, power consumption joined the list of retailers' key concerns. Since PC-based IT makes up a giant share of higher energy bills, retailers have another reason to consider thin-client computing with its drastically lower energy requirements.

B. High Employee Turnover

Another trend of concern to retailers is high employee turnover. Because training on complex POS systems takes too long and costs too much, a substantial investment walks out the door with each departing employee. This is raising retailer interest in easy-to-learn thin-client POS.

High turnover is coupled with a shortage of entry level workers in some retail areas, especially the food sector. To counter lower store productivity, these retailers are taking a closer look at self-service POS.

C. New Kinds Of Competition And Consumer Buying Methods

Even though retailers are tightening their belts in reaction to the economic environment and decreased consumer spending, they are accelerating their technology investments to help them acquire and retain customers. Gartner Group estimates an 11 percent CAGR in the POS market through 2004.

In the drive for customer loyalty, point-of-sale is front and center.

Consumers expect more from retailers than ever before. More and more they want to use non-cash forms of payment. They're putting pressure on stores to match the speed and convenience of web shopping. To compete, faster throughput at in-store point of sale is essential. But adding more PC-based POS systems to shorten lines would only raise TCO beyond the breaking point. For help, retailers are turning to technologies like self-service checkout.

Consolidations in the Food/Supermarket segment are intensifying competition and margin pressure. A few years ago, Wal-Mart was not even selling groceries. Now, by some estimates, it is #2 in grocery sales behind Kroger. Because Wal-Mart can leverage margins of non-food items in the superstore, they can take lower profit on the food items, thus driving down margins across the sector. The profit squeeze is limiting IT spending to improvements that can generate efficiencies and a stronger bottom line. As a result, self-checkout terminals are attracting greater attention from food retailers.

How Thin-Client POS Benefits Retailers And Solutions Providers

Thin client at point-of-sale provides solutions to retailers' key concerns — and it does so with versatility. Versatility is important to technology providers because, while retailers share common challenges, they remain a very diverse market. Solutions must scale and be flexible. To fit various retail scenarios, thin-client POS can assume many forms from manual to self-service to double-duty and from locked-down to kiosks to mobile. For solutions providers, this versatility lowers manufacturing costs and maximizes the potential market.

Retailers are moving to thin-client POS to achieve three objectives: Cost-reducing efficiencies, customer service improvements, and business growth opportunities.

A. Cost-Reducing Efficiencies

IT Savings Thin clients have the potential to generate substantial total cost of ownership (TCO) savings. By Gartner Group estimates, savings could well exceed 20% annually over loosely managed PCs. The reasons are many:

Capital Savings Thin-client POS radically reduces investment in CPUs, hard drives, RAM, network bandwidth and software licenses over the necessary investment in a distributed environment.

Minimal Administration Central management of software and terminals equal minimal administration. A move from distributed PC to thin client means no longer needing to upgrade client technology every 18 – 30 months to maintain hardware compatibility with the latest developments in software and applications. In thin-client server-based computing, such upgrades are made only at the central server. Scalability is also a snap. It's as easy to make systems available to 10,000 users as to 100. (*InfoDesign*)

Minimal Maintenance Compared to a PC-based system, far fewer things can go wrong with a thin-client POS. There is no hard drive to crash. No complex operating systems or local applications. Not even any moving parts. With little or no code on the client, conflicts are practically eliminated. Users don't try to fix their own machines. As a result of all this, system reliability goes up, and support costs go down. Up to 90 percent less time can be spent on service, maintenance, and support.

Fast Application Deployment Centralized application code significantly reduces the cost of deploying and keeping applications current. By the same token, consistency is maintained across branches and franchises.

Flexibility Server-based data and applications makes the choice of client extremely flexible. Thin clients can be handheld devices or desktop PC look-alikes or multimedia kiosks or something custom-tailored to a unique retail environment or, in a pinch, even a reconfigured fat client. There's flexibility in where the POS is situated because thin-client systems enable roaming access. And thin client adoption positions a retailer for supply chain intranets and ecommerce at some point because the technology includes remote access over dial-up connections and WANs, as well as access to the applications from the Internet.

Right Tool for Right Job Using a PC for anything except absolutely necessary tasks (a 20 percent probability, according to Gartner Group) can be an expensive misallocation of assets. The optimum environment for thin client is task-oriented, not content-producing, which makes POS an ideal candidate.

Training Cost Savings The thin client's simplicity and graphical user interface cuts training time to the quick. Savings add up significantly given retail's high employee turnover rate.

Labor Savings In addition to offering a potential solution for stores facing a tight labor market, thin-client self-checkout allows stores to cut labor costs, which account for more than 90 percent of the costs associated with running the front end of a retail store.

Security Savings With no user access to operating and network systems, thin-client environments prevent accidental data corruption and enable fast recovery from virus attacks. They're also theft-proof, being worthless as standalone devices.

Low Energy Consumption A recent energy consumption study using NCD thin clients found that PCs consume nearly seven times more power than thin clients do – 69 watts versus 10 watts. Thin clients also generate less heat. Adding in the cooling factor, power usage totals 103.5 watts for PCs, versus 15 watts for thin clients. Thin-client networks cost 30-60% less to power, depending on network size. A small business with 100 users can save as much as \$6,000 per year. For a 2,500-user company, savings could reach \$149,391.

[Thin-client Computing sponsored study: "Network Computing Devices Power to the People: Comparing Power Usage for PCs and Thin Clients in an Office Network Environment"]

B. Customer Service Improvements

All retailers are interested in lowering TCO for their POS, but leaders are even more interested in increasing customer service and competitive advantage. By its nature, thin-client POS accomplishes both objectives. Self-service checkout, for instance, saves time for customers while it cuts store costs.

Gas Station Scenario: *For a real world example, compare today's self-serve POS at gas stations with traditional attendant service. The new model cuts costs by tying all stations together, enabling automatic price updates. Speedier POS transactions increase potential sales and improve customer service. And the POS kiosk display can be used to entertain or inform consumers while they're pumping gas. Today it might be weather, sports scores, or a car wash suggestion. Tomorrow will bring more sophisticated applications.*

Thin-client POS helps retailers attract shoppers and retain customers in a number of ways.

Faster Service

A June 2001 survey conducted for POS technology leader, NCR Corporation, reveals that consumers welcome self-service, a technology that is expected to pass \$1 billion in the next few years. NCR retail customers report that self-checkout kiosks are quickly paying for themselves by enabling more sales and raising store employee productivity. The real reward is rising customer satisfaction.

Higher Quality Service

With the help of thin-client POS, sales staff can be more responsive to customers' needs. Employees can access corporate systems without leaving the sales floor. They have instant access up-to-date product and inventory information. No longer must customers wait while staff searches shelves for an item. Many customers appreciate self-service kiosks for providing privacy to search for and buy products of a personal nature.

Convenience For convenience, it's hard to beat in-store kiosks. They show time pressed shoppers whether or not items are available and where to find them. They let customers personally configure home entertainment centers, PCs or blue jeans. And they can be customized for almost unlimited uses, including photo processing, home decorating, ticketing and other do-it-yourself services.

A Case For Thin-Client Kiosks

In a KPMG study of new retail technologies, 76 percent of participating consumers rated kiosks as an advantage, 60 percent were more likely to shop at a store with these technologies, and 80 percent expected to use the technologies at least some of the time they shopped. Consumers felt that product information/ordering kiosks would make shopping faster and easier by helping them find what they wanted and providing detailed and current product information. Shoppers liked frequent shopper kiosks because they highlight items that are on special and eliminate the need to clip and carry coupons, thus saving them money.

"In all cases, consumers disliked the prospect of waiting in line to use the machines and recommended that several kiosks be installed in each store to accommodate demand."

[KPMG Retail Technology in the Next Century]

A PC-based network implementation would make a single self-service POS, much less multiple units, far too costly for most retailers. To run a full function self-service terminal currently averages \$40,000 a year.

[NCR, "Improving Self-Service Operational Efficiency"]

Enter server-based thin-client POS. With its lower TCO and easy expandability, the competitive advantages of self-service are now available to retailers of all kinds and sizes. This capability is attracting growing attention across the retail industry.

First Movers

According to IHL Consulting Group, one retail sector will lead the thin-client movement. These are the creative specialty hard goods retailers that invented new ways to do business. So-called category-killers include Home Depot, Staples, and Borders, to name a few. They remain most open to new technology and most likely to try innovative solutions.

[IHL Consulting Group, "2001 North American Retail POS Terminal Market Study"]

Early adopters like these will demonstrate the unique power of thin-client POS, not only to cut costs and improve service, but to grow businesses.

C. Business Growth

With thin-client technology, retailers will use point-of-sale in ingenious ways to reach new markets and capture new revenue sources.

Gas Station Scenario: *At this stage, the POS climbs the ladder to a sales position. Not only does it promote standard gas station items, but other products and services from partners, as well. While a customer fills up the car, the POS displays tempting treats for sale at the snack bar. The next step could be showing hotel ads with the option to reserve rooms through the POS. Local retailers could use this channel to advertise. If the information is useful, the ad is perceived as a service. At the least, it helps the customer pass the time while pumping gas.*

EFTS Taps Revenue Streams

Thin-client POS with electronic funds transfer capability is a game changing technology. It empowers retailers to turn dead time into business opportunities. With cost-effective, interactive technology that processes smart card transactions, services never before possible will become commonplace. Retailers can sell – and consumers can buy – anything from anywhere. Affinity marketing programs displayed on self-service interactive POS stations will offer shoppers catalog merchandise, web-only products, or goods and services in local stores. Profits will return to the retail industry.

Scalable ROI

Because thin-client POS is so flexible and easily scalable, large implementations offer exceptional ROI potential.

Case in point. Global retail technology leader, XN Corporation, supplies thin-client point-of-sale systems to PARCO Bugis Junction – a shopping mall featuring Singapore's first glass-covered, air-conditioned shopping streets. Some 100 Xn400 touchscreen multimedia POS

system units manage transactions from the 400,000 visitors passing through the mall weekly. The POS system is installed in most of the mall's food and beverage and merchandising outlets. Being centralized, XN's thin-client solution is cost-effective for tenants. In addition, it gives PARCO Bugis Junction effective financial management tools to measure the success of its mall. The Xn400's second screen is used for interactive multimedia or advertising. Besides making an impact on the customer at point of purchase, this can generate significant incremental revenue.

“One of our customers, a major fast food chain, believes that prompted upselling from touch screen kiosk technologies, increases the value of each transaction by \$1.20,” says Karim Rahemtulla, CEO of XN Corporation Asia. “This is more than a product. Together with our technology partners, we are offering a visionary model for the delivery of business value at the point-of-sale.”

Wireless Payment Devices

The low cost and versatility of thin-client technology could make thin-client POS ubiquitous. And who needs wires? Wireless payment devices are smart EFT terminals that have an 802.11 wireless connection to the base unit. When self-service POS goes mobile, possible revenue sources abound. Riding in a taxi, for instance, people could watch theater promos and book tickets through a wireless EFTS POS in the cab.

Web-Enabled POS

Looking further out, web-enabled POS is the way of the future. The confluence of server-based thin-client POS and Internet standards holds vast potential for the retail industry. Today, global retail leaders like MacDonald's and Pepsi use Internet-enabled kiosks to touch stores all over the world instantly and simultaneously. Tomorrow, thin-client POS could make global business feasible for many more merchants.

A. Thin-Client Defining Features

A thin-client computing environment consists of an application server, a network, and thin-client devices.

Application Server

The workhorse of the setup is the application server, a computer with enough processing power and memory to serve all clients and their application needs.

Hardware features vary by vendor, however, certain components are essential for optimal performance. These include an integrated x86 processor. Powering many thin-client POS systems is National's complete silicon solution that includes the proven Geode™ GX1 processors, its companion chips and SuperI/O devices. The Geode technology is optimized for information terminals and provides the best combination of performance, power dissipation and price. It is ideal for point-of-sale (POS) terminals or in-store multimedia kiosks that require instant information access to the Internet and the intranet.

Windows-based terminals require either Microsoft Windows XP Terminal Server Edition and Citrix MetaFrame to run the thin-client protocol based on Independent Computing Architecture (ICA®), or Microsoft Windows 2000 Terminal Server Edition to support Remote Display Protocol (RDP). With Windows 2000, Microsoft built support for thin clients directly into the standard server versions of the software.

AS/400 customers require 5250 emulators on the server. If remote servers are used through corporate headquarters, a local PC can be installed for booting up the thin clients and as backup DHCP services.

Network

The network infrastructure is the pipeline between the server and the client. Thin clients generally use standard Ethernet or telephone networks. Wireless models are increasingly available, as well. Most organizations hire a systems integrator, consultant, or value added reseller (VAR) with experience in designing and implementing thin-client networks for the initial setup and to provide training.

The WAN bandwidth needs will vary depending on the applications, number of concurrent users, and the thin-client

devices selected. Thin clients use less bandwidth than traditional PCs because they transfer only mouse clicks and keystrokes to, and screen images from, the server. For any POS network, reliability is critical. Thin-client computing is no different. Some thin clients come with local boot options and few native applications to make them less network-dependent. Today's retailers know, however, that a highly reliable network is a requirement of doing business.

Thin-Client Devices

Thin client is a growing class of devices optimized for server-based computing.

Smaller than typical desktop computers (about the size of a textbook), the "thinnest" thin clients have no moving parts. They contain a microprocessor capable of processing graphics, network interface capability, a video subsystem, and enough memory (at least 16 MB) to run system software to connect to the server. They do not need a hard drive, floppy drive, or CD-ROM drive. Most thin clients have a sealed case design without open slots for additional security. Some thin clients have integrated display devices, reducing desk space and acquisition cost. Thin clients last longer and use less energy. Upgrades can be downloaded from the manufacturer's web site. They have a locked-down desktop to ease management and still offer a full range of productivity, web browsing and specialized mainframe software. Depending on user needs, thin-client devices come with different processing, memory, and application options.

A. Thin Client Increases Value Of POS

It's time for business to see point-of-sale in new, much broader terms. Time to think out of that box on the counter. The cash register... electronic cash register... PC... client/server network... each innovation helped retailers get more from point-of-sale machines. But with power came complexity and cost. Now thin client steps in to address today's retail challenges. This time, retailers get more out of their POS at less cost.

Thin-client technology empowers point-of-sale to do far more than ring up sales, more than keep track of inventory. As part of a server-based system, thin-client POS devices perform cost-saving and customer service functions today. And become powerful revenue generators tomorrow.

The retailer's reward for embracing thin client shows up on both bottom and top lines.

- Reduced maintenance, training, and energy costs
- Speedier transactions and application deployment
- Higher levels of service that bring customers back for more

When the time is right, retailers can put their thin-client POS solutions to work as innovative sales and service vehicles, expanding markets and generating revenue streams. An era of greater opportunity and profit is emerging for the retail industry as thin-client computing gains momentum in the marketplace.

For more information about National's total system solutions for the emerging
thin-client POS market, visit our web site:

ia.national.com